

Remarks

I. Status of claims

Claims 1-20 are pending.

Claims 21-25 have been added.

II. Claim rejections

The Examiner has rejected claims 1-20 under 35 U.S.C § 102(e) over Forbes (U.S. 6,728,896).

A. Independent claim 1

The Examiner has asserted that:

As per claims 1, 10, 11, 19 and 20 Forbes disclosed a system for managing a plurality of distributed nodes of a network, comprising: a recovery module configured to migrate from one network node to another, determine a status of a network node, and initiate a recovery process on a failed network node (col. 3, lines 48-67, col. 4, lines 1-33).

Contrary to the Examiner's assertion, however, Forbes does not teach or suggest anything about a recovery module that is configured to migrate from one network node to another, determine a status of a network node, and initiate a recovery process on a failed network node, as recited in independent claim 1.

In the section of Forbes cited by the Examiner, Forbes teaches that (col. 4, lines 1-11 and 27-33):

Communication between the nodes of a cluster enables MSCS to detect the node failures, status changes, and to manage the cluster as a single entity. Nodes in a cluster communicate using their Cluster Services. The Cluster Service keeps track of the current state of the nodes within a cluster, and determines when a group and its resources should failover to an alternate node. This communication takes the form of messages that are sent

regularly between the two nodes' Cluster Services, these messages being designated as "heartbeats".

...

HEARTBEAT: In the Microsoft clustering system, the heartbeat is a message that is sent regularly by the Cluster Service on one node to the Cluster Service on the other node across a private network connection. This is part of the Microsoft Cluster Server technology. The disappearance of the heartbeat is assumed to imply a failure of the node.

With reference to FIG. 5A, Forbes additionally teaches that (col. 9, lines: 1-7):

At step F, there is shown a provision to check for the "heartbeat". This involves getting a signal from the second server 20 to the first server 10. At this point at every 1.2 seconds, the Cluster Service is operating to send the same message that tells the first server 10 that the second server 20 is up and operating. This signal will indicate the statement that "I'm here, are you here?".

The sections of Forbes' disclosure that are quoted above clearly teach that the Cluster Services on each of the cluster nodes regularly send heartbeat messages to one another. When the Cluster Service on a given one of the nodes fails to send heartbeat messages, the other nodes in the cluster infer that the given node has failed from the failure to receive any heartbeat messages from the give node.

In his rejection, the Examiner has failed to point specifically to the component of Forbes' system that he believes corresponds to the recovery module recited in claim 1. In the section of Forbes' disclosure that the Examiner has cited in support of his rejection of claim 1, the heartbeat messages are the only objects that are transmitted from one node to another node.¹ Accordingly, the Examiner's rejection must be premised on the assumption that a heartbeat message constitutes the recovery module recited in claim 1. For the following reasons, however, the heartbeat messages that are transmitted between the nodes in Forbes' approach do not constitute the recovery module recited in claim 1.

1. The heartbeat messages are not configured to determine a status of a network node. The heartbeat messages merely indicate the status of the transmitting network nodes. The

¹ It is noted that Forbes does not teach or suggest anything that would have led one of ordinary skill in the art at the time the invention was made to believe that the Cluster Services migrate from one node to another.

status of a given node is instead determined by the Cluster Service operating on a node that expects to receive a heartbeat message from the given node.

2. The heartbeat messages are not configured to initiate a recovery process on a failed network node. Instead, the MSCS software performs failover and application re-start processes (see col. 9, lines 8-18 and 46-51).

Thus, for the reasons explained above, the Examiner cannot reasonably maintain that the heartbeat messages that are transmitted between the cluster nodes in Forbes' approach corresponds to the recovery module recited in claim 1.

For at least these reasons, the Examiner's rejection of independent claim 1 under 35 U.S.C. § 102(e) over Forbes should be withdrawn.

B. Claims 2-10 and 21-25

Each of claims 2-10 and 21-25 incorporates the features of independent claim 1 and therefore is patentable over Forbes for at least the same reasons explained above. Claims 2 and 3 also are patentable for the following additional reasons.

Regarding claim 2, the Examiner has asserted that in col. 9, lines 8-12, Forbes discloses a routing component for determining a next hop address from an origin network node to a destination network node. The disclosure in col. 9, lines 8-12, however, recites that:

In the event of a server failure, the MSCS software employs a "shared nothing" clustering architecture that automatically transfers ownership of resources (such as disk drives and IP addresses) from a failed server over to a surviving server.

However, the IP addresses whose ownership is transferred to the surviving server in Forbes' approach do not have anything to do with next hop addresses for migrating a recovery module from an origin network node to a series of successive destination network nodes, as now recited in claim 2. Indeed, the heartbeat messages do not migrate from an origin network node to a series of successive destination network nodes. Rather, each message is sent by a transmitting node to a recipient node, where the message is interpreted as a "heartbeat" signal. The recipient node does not re-transmit the message to another node. Instead, the recipient node sends its own "heartbeat" message that indicates the statement

"I'm here, are you here?". The same messages must be re-sent by each of the nodes every 1.2 seconds in order to maintain their respective "heartbeats".

Claim 3 incorporates the features of claim 2 and therefore is patentable over Forbes for at least the same reasons.

C. Independent claim 11

Claim 11 has been amended and now recites:

Claim 11 (currently amended): A method for managing a plurality of distributed nodes of a network, comprising:

- (a) on a current one of the network nodes, determining a status of the current network node;
- (b) in response to a determination that the current network has failed, initiating a recovery process on the current network node;
- (c) migrating from the current network node to a successive one of the network nodes; and
- (d) repeating (a), (b), and (c) with the current network node corresponding to the successive network node for each of the nodes in the network.

Claim 11 is patentable over Forbes for the following reasons.

1. The heartbeat messages do not migrate from one network node to successive network nodes. Rather, each message is sent by a transmitting node to a recipient node, where the message is interpreted as a "heartbeat" signal. The recipient node does not re-transmit the message to another node. Instead, the recipient node sends its own "heartbeat" message that indicates the statement "I'm here, are you here?". The same messages must be re-sent by each of the nodes every 1.2 seconds in order to maintain their respective "heartbeats".
2. The heartbeat messages are not configured to determine a status of a network node. The heartbeat messages merely indicate the status of the transmitting network nodes. The status of a given node is instead determined by the Cluster Service operating on a node that expects to receive a heartbeat message from the given node.
3. The heartbeat messages are not configured to initiate a recovery process on a failed network node. Instead, the MSCS

software performs failover and application re-start processes
(see col. 9, lines 8-18 and 46-51).

For at least these reasons, the Examiner's rejection of independent claim 11 under 35 U.S.C. § 102(e) over Forbes now should be withdrawn.

D. Claims 12-19

Each of claims 12-19 incorporates the features of independent claim 11 and therefore is patentable over Forbes for at least the same reasons explained above.

E. Independent claim 20

Claim 20 has been amended and now recites that the computer program comprises computer-readable instructions for causing a computer to:

migrate the computer program from one network node to a series of successive network nodes;

determine a status of each network node to which the computer program is migrated; and

initiate a recovery process on each network node to which the computer program is migrated and is determined to have failed.

Claim 20 is patentable over Forbes for the following reasons.

1. The heartbeat messages do not migrate from one network node to a series of successive network nodes. Rather, each message is sent by a transmitting node to a recipient node, where the message is interpreted as a "heartbeat" signal. The recipient node does not re-transmit the message to another node. Instead, the recipient node sends its own "heartbeat" message that indicates the statement "I'm here, are you here?". The same messages must be re-sent by each of the nodes every 1.2 seconds in order to maintain their respective "heartbeats".

2. The heartbeat messages are not configured to determine a status of a network node. The heartbeat messages merely indicate the status of the transmitting network nodes. The status of a given node is instead determined by the Cluster Service operating on a node that expects to receive a heartbeat message from the given node.

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Serial No. : 09/895,235
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Page : 11 of 11

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3. The heartbeat messages are not configured to initiate a recovery process on a failed network node. Instead, the MSCS software performs failover and application re-start processes (see col. 9, lines 8-18 and 46-51).

For at least these reasons, the Examiner's rejection of independent claim 20 under 35 U.S.C. § 102(e) over Forbes now should be withdrawn.

III. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 08-2025.

Respectfully submitted,

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